

FINAL REPORT

March 1, 2002

By

The Blue Ribbon Panel on Ergonomics

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I. INTRODUCTION

The Ergonomics Regulation

On May 26, 2000, the Washington Department of Labor & Industries (L&I) adopted an ergonomics rule (WAC 296-62-051) designed to reduce workplace hazards, such as awkward lifting and repetitive motion, that cause more than 50,000 work-related musculoskeletal disorder injuries each year. L&I conducted a cost-benefit analysis that estimated an annual \$80.4 million annual cost to Washington businesses to comply with the regulation. L&I projected the annual benefit from the standard at \$340.7 million.

Prior to the promulgation of the L&I rule, the only state with an ergonomics standard was California, which has taken a significantly different regulatory approach. A federal OSHA standard had been in development for a number of years and was adopted on November 14, 2000. The OSHA standard more closely resembled L&I's rule than California's, but still took a somewhat different approach. Subsequently, the OSHA ergonomics standard was overturned by Congress. The end result is that Washington and California remain the only two states with an ergonomics regulation.

The L&I ergonomics standard requires employers to analyze their workplaces to determine if "caution zone" jobs are present. These are jobs that exceed a specified exposure limit for workplace ergonomic risks (for example, lifting objects weighing more than 75 pounds once per day or more than 55 pounds more than 10 times per day). Employees working in "caution zone" jobs must be given ergonomics awareness education and be allowed to participate in the development of the employer's ergonomics program. The "caution zone" jobs must be further analyzed to determine if they exceed specified exposure limits that would categorize the jobs as constituting a "hazard." If employers find hazards, they must reduce the exposures below the hazard level, or to the extent technologically and economically feasible. The rule has a staggered, two-tier phase-in Implementation period.

The Blue Ribbon Panel

On May 25, 2000, in a letter to Gary Moore, Director of the Department of Labor & Industries, Governor Gary Locke requested that an independent Blue Ribbon Panel on Ergonomics be established (a copy of the letter is attached to this Introduction). The Governor directed that the Panel assess whether four criteria have been met:

- demonstration projects have been successful;
- effective education materials are widely available;
- the requirements are understandable; and
- the enforcement policies and procedures are fair and consistent.

The Panel was directed to issue a report to L&I providing its assessment of these criteria. The governor indicated that he expected L&I to act on the Panel's conclusions before any enforcement occurs.

The work of the Panel, as instructed by the governor, examined only the four criteria related to implementation of the rule.

The Panel's Work

Eleven members, including two co-chairs, were appointed by L&I to serve on the Blue Ribbon Panel (a copy of the L&I press release naming the Panel is attached to this Introduction). Two panel members subsequently resigned due to new job responsibilities. Four meetings were held, in April, July and November of 2001, and in February, 2002. At each of the four meetings, public comments were accepted both in person and in writing. L&I representatives also made remarks and answered questions from the Panel. A written survey to solicit information from participants in the demonstration projects was distributed by the Panel. In addition, a public hearing was held in October, 2001, to take further comments from the public. The public hearing was televised by T.V.W., and was videotaped for further consideration by the Panel. T.V.W. also broadcast another portion of the Panel's meeting, including public comment, in November, 2001. In addition to answering questions and providing materials based on the Panel's requests, L&I provided staff logistical support in order to facilitate the meetings.

After reviewing the written and oral public comments received by or brought to the attention of the Panel over the course of its work, it appears that a number of the public have the mistaken expectation that the Panel's work would include addressing the rule, itself. The Panel was neither charged to nor has it engaged in an analysis of the rule. The Panel limited its conclusions to the scope of the four criteria in the governor's letter and did not address those issues raised by the public that went to the other basic elements of the rule. Without clarifying this matter, the Panel's report on its charge may have appeared inconsistent with the view of these members of the public.

The Report

This report includes an executive summary and recommendations, along with a detailed assessment of the criteria the Governor asked us to address. The report completes the work of the Blue Ribbon Panel. Copies of written comments received by the Panel are in the public record and can be obtained from the Department of Labor & Industries. We would like to thank the many members of the public who have provided information and suggestions to the Panel.

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GARY LOCKE
Governor



STATE OF WASHINGTON

OFFICE OF THE GOVERNOR

P. O. Box 40002 • Olympia, Washington 98504-0002 • (360) 753-6780 • TTY/TDD (360) 753-6466

May 25, 2000

Gary Moore, Director
Department of Labor and Industries
P.O. Box 44001
Olympia, WA 98504-4001

Dear Gary:

I appreciate the hard work that you and your staff put into the development of an ergonomics rule. As the Department of Labor and Industries (L&I) moves forward with this rule, I want to make clear my expectations.

Before L&I enforces this rule, I want to be able to provide assurance to our state's employers that the agency has fulfilled its obligations. For that reason, I am directing you to establish an independent blue ribbon panel to assess whether the following criteria have been met:

- demonstration projects have been successful;
- effective education materials are widely available;
- the requirements are understandable; and
- the enforcement policies and procedures are fair and consistent.

The panel will issue a report to you indicating whether the criteria have been met. I expect you to act on the panel's conclusions before any enforcement occurs.

The panel must be made up of individuals who have not actively participated in the ergonomics debate. The membership should include individuals with appropriate experience and diverse backgrounds, including experts from throughout the nation. The panel must be chaired by a widely respected professional, such as the dean of a school of

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public health. I will expect you to provide the panel with whatever staffing and support are needed.

To encourage employers to participate in the ergonomics demonstration projects, I also direct you to use your existing authority to offer industrial insurance premium discounts to selected employers. These projects will:

- develop model education programs;
- share industry best practices;
- establish safe harbors for compliance; and
- develop and test L&I's inspection policies and protocols.

I also want you to work with business and labor to develop a legislative proposal to fund technical assistance grants for ergonomics.

L&I's occupational health and safety responsibilities are important, and we must pursue them in a fair and reasonable manner.

Sincerely,

Gary Locke
Governor

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Jan. 31, 2001

Eleven named to state's Ergonomics Blue Ribbon Panel

TUMWATER — The Department of Labor and Industries today appointed 11 members to serve on the state's new Blue Ribbon Panel on Ergonomics. The panelists include representatives from business, labor, medicine, education and law.

"This is an outstanding group of civic-minded individuals," said L&I Director Gary Moore. "They are highly respected in their fields, and they bring diverse expertise to ergonomics. Washington's employers and workers will benefit from their work."

Adopted last May, the rule requires employers to protect their employees from work-related injuries such as back strain, tendinitis and carpal tunnel syndrome. The requirements will be phased in over six years, beginning July 1, 2002.

"We're asking the panel members to review L&I's actions and assess whether the rule requirements are understandable and the proposed enforcement policies are fair and consistent," Moore said. "We will not enforce the rule until determining that effective educational materials are widely available and demonstration projects are successful."

Co-chairs of the ergonomics blue ribbon panel are Claude Golden, attorney and regulatory/legislative analyst, Environmental Affairs Office, The Boeing Company; and Larry Bindner, assistant business manager, Washington and Northern Idaho District Council of Laborers. Other members are:

- William Andersen, professor, University of Washington Law School
- Stewart C. Burkhammer, engineer and principal vice president/manager, Environmental, Safety and Health Services, Bechtel Corporation, Frederick, MD
- Lee Anne Jillings, executive director, Voluntary Protection Plan Participants Association, Falls Church, VA
- Gwen Malone, ergonomics manager, General Motors Powertrain Group, Pontiac, MI
- James McCauley, director safety-security (retired), Perdue Farms, Willards, MD
- James A. Merchant, M.D., Ph.D., dean, University of Iowa School of Public Health
- Susan Schurman, president, George Meany Center for Labor Studies – National Labor College, Silver Springs, MD
- Pat Tyson, chair, Board of Directors, National Safety Council, Atlanta, GA
- David Wegman, M.D., professor and chair, Department of Work Environment, University of Massachusetts–Lowell

The panel will report its recommendations to L&I on an ongoing basis over the next year.

II. EXECUTIVE SUMMARY AND RECOMMENDATIONS

The Criteria

In his letter of May 25, 2000, establishing the Blue Ribbon Panel on Ergonomics, Governor Gary Locke instructed Gary Moore, director of the Department of Labor and Industries, as follows:

“Before L&I enforces this rule, I want to be able to provide assurance to our state’s employers that the agency has fulfilled its obligations. For that reason, I am directing you to establish an independent blue ribbon panel to assess whether the following criteria have been met.

- **Demonstration projects have been successful;**
- **Effective education materials are widely available;**
- **The requirements are understandable; and**
- **The enforcement policies and procedures are fair and consistent.”**

Conclusions

The Panel held four public meetings, sponsored a public hearing, gathered and reviewed a substantial amount of information from the department and from the public over the course of the past year. After careful deliberation, we have arrived at the following conclusions:

Demonstration Projects. The objective of the demonstration projects was to provide concrete examples by and for employers on how to comply with the rule and to test in the demonstration process whether the rule was understandable. The Panel concludes that the demonstration projects have met this objective. The projects have shown that the rule is understandable and the various guides, documents, checklists and other materials produced during the demonstrations will be helpful in the practical management of the rule.

Education materials. The purpose of the assessment of the educational programs was to determine if effective educational materials are widely available. The Panel has concluded that effective educational materials are widely available.

Understandability. The Panel was asked to determine whether the requirements of the rule are understandable. The Panel believes the rule itself is clearly written, and together with the educational materials, enforcement policies and procedures, is understandable.

Enforcement Policies and Procedures. The Panel was asked to determine whether the enforcement policies and procedures are fair and consistent. While it is difficult to assess the fairness of a process prior to its implementation, the Panel believes the process described by the rule, its implementing WISHA Regional Directive (WRD) and the WISHA enforcement procedures provide a foundation for fair and consistent enforcement.

Recommendations

While the panel believes the criteria the governor established have been met, we offer the following recommendations to facilitate effective and fair implementation of the ergonomics rule.

Recommendation 1. As WISHA proceeds to the subsequent stages in the implementation of the ergonomics rule, the demonstration project approach should continue to be used to assist the agency in further promoting understanding of the rule. The agency should develop a specific plan for the next phase of demonstration projects, which should be run in as many industries as is reasonable, with emphasis on industries where significant hazard reductions can be anticipated. The panel strongly encourages all employers and employees to participate in these demonstration projects when offered the opportunity.

Recommendation 2. Further development of educational programs should continue and, in particular, should include additional training on alternative hazard analysis tools. Special attention should be given to the educational and training needs of small businesses.

Recommendation 3. The Department should explore innovative programs to further promote their consultation services to employers. Adequate resources should be provided to these and other outreach programs.

Recommendation 4. As an additional aid to consistency, during the first two years of enforcement of the ergonomics regulation, the Department should clear all citations, prior to issuance, through its office of the Ergonomics Program Director.

Recommendation 5. The Department should, on a regular basis, report on the progress of current and future demonstration projects, educational programs, consultation programs and enforcement activities to the WISHA Advisory Committee.

III. ANALYSIS OF THE FOUR CRITERIA

A. *Demonstration Projects*

I. Background to the Demonstration Projects

The Department of Labor and Industries identified the purpose of demonstration projects to be:

“...to provide employers, through collaboration with L&I, the opportunity to develop and demonstrate tools and skills helpful for complying with the ergonomics rule.... The results of these projects are products that can be shared with the entire industry statewide.”

The introduction of the demonstration project concept during the implementation phase was designed to work with employers on demonstrations of how the rule would actually work. In that regard, demonstration projects were intended to provide concrete *examples* by and for employers on how to comply with the rule in order to *demonstrate* an adequate *understanding* of the rule. This effort was different from the workshops and policies designed to describe how to comply with rule because it offered examples of how the rule and materials designed to explain it would actually be understood.

The Department presented the Panel with two cases that illustrate the role of demonstration projects in implementing the rule.

“Our workshops describe types of employee education materials that would comply with the rule. One of our demonstration projects is providing a concrete example of an awareness education program that meets the rule requirements.”

“Agency policies, education programs and the rule itself explain what employers must or can do to identify caution zone jobs and evaluate them for hazards. Demonstration projects will provide concrete examples of ways that employers can do these analyses. They will also show how some employers have found ways to reduce exposures below the hazard level or to the degree feasible.”

The demonstration projects fall into one of three categories:

Risk Factor Identification

- Understanding and correct assessment of caution zone jobs
- Understanding and correct assessment of hazard zone jobs

Developing education materials, which include:

- Basic awareness education in ergonomics

Content for industry-specific training.

Identifying industry best practices to reduce hazards and establishing safe harbors for compliance including non-mandatory examples of acceptable ways to comply.

All the demonstration projects share the property of being examples of selected provisions in the rule rather than explanations of them. In each of the demonstration projects undertaken, the staff of the Department worked with employers who volunteered to participate in a specific effort to examine how to implement various aspects of the rule. The results of the projects, where possible, are also translated into information and educational materials and activities that other employers can use. The demonstration project plan was to cover a number of industry groups with special efforts to achieve at least one demonstration project opportunity for each of the top 12 industries.

II. Evaluation of the Demonstration Project Effort

The Blue Ribbon Panel was charged with assessing whether the demonstration projects have been successful in providing examples of how to implement the rule. The products from these projects as well as the project objectives provide the basis for assessment.

The Panel reviewed the first 26 projects categorized into the three specific areas: Risk Factor Identification, Best Practices (Industry Specific) and Safe Harbors, and Education Materials. These areas of demonstration projects are expected to achieve different endpoints.

Risk Factor Identification/Assessment Projects should demonstrate the ability and methods to identify ergonomic risk factors in the caution and hazard zones as defined by the rule. Employers and Supervisors should understand and use the caution zone checklist correctly in both cyclic and non-cyclic jobs.

Best Practice/Safe Harbor Projects should identify control measures that serve as either safe harbor/acceptable practices or can be viewed as best practices. Based on the structure of the demonstration projects these will be industry specific. However, there are many instances when information on control measures can be shared and tweaked for other industries. Sometimes it is just the knowledge that a vendor or supplier can provide alternative solutions.

Education Material Projects should develop materials that can be useful in an effort to make basic ergonomic awareness training industry specific. Additionally these education materials should include control measure examples where possible.

The participants for the demonstration projects were identified based on:

1. WISHA contacting business and labor groups and inviting them to participate,
2. WISHA contacting existing business –labor L&I problem-solving groups (e.g. sawmill),
3. Some employers contacted WISHA about participating (agriculture), and
4. Employers who had work with WISHA in some other capacity were contacted.

The 26 demonstration projects are characterized in Table 1.

In order to evaluate the success of the demonstration project plan, we gathered information from the participants in the demonstration projects, the Department of Labor & Industries (L&I), and the interested public. These inputs took the following forms:

A survey, developed by a subcommittee of the panel, was distributed by L&I staff to every demonstration project participant. The survey was accompanied by a 2-page summary of the project which also included a list of all participants. At least two reminders were sent to non-respondents to seek the best possible response rate.

A selected number of the project participants made a presentation at one of the Panel meetings.

Public comment was solicited at a public forum held on October 10, 2001 at the Seattle Center, as well as provided during the public comment period at each of the Panel meetings. Roughly, the public comments can be characterized as follows: 85% were from the business community, 10% were from labor, and 5% were from other stakeholders.

Written materials were submitted by interested parties at various times during the process.

What follows are the results of the survey, plus a synopsis of the information provided by the public at the forum as well as the other referenced venues.

Survey of Demonstration Projects

The survey asked participants to approve or amend the statement of demonstration project goals contained in the 2-page summary and to assess the project's success in meeting those goals.

The survey response tally is provided in Table 2

Table 1: Ergonomics Demonstration Project Matrix – as of February 11, 2002

SIC	Size	Compliance Phase	Industry/Project Name	Complete (Status)	Risk Factor ID	Best Practices, Safe Harbors	Education Materials	Product(s) Completed
078	<50	1	Landscaping and Horticultural	Yes	Y	Y		Yes
175	>50	1	Carpentry and Floor work (GLY)	June 2002	Y	Y		Yes
176	>50	1	Sheet metal (McKinstry)	Yes	Y	Y	Y	Yes
177	>50	1	Concrete work (Ferguson)	Yes	Y	Y	Y	Yes
451	>50	1	Air Transportation	Yes	Y	Y		Yes
836	>50	1	Residential Care	May 2002	Y	Y		No
152	Various	1+2	Residential Construction	Yes	Y	Y	Y	Yes
174	Various	1+2	Masonry, Stonework, Tile setting	Yes	Y	Y	Y	Yes
174	Various	1+2	Wallboard (Plastering)	Yes	Y	Y	Y	Yes
176	Various	1+2	Roofing	June 2002	Y	Y		No
242	Various	1+2	Sawmills	Yes	Y	Y	Y	Yes
	NA		Awareness Education (Toolbox Group)	Yes			Y	Yes
174	<50	2	Spilker Masonry	June 2002	Y	Y	Y	No
154	>50	2	Commercial Construction (Lydig)	June 2002	Y	Y	Y	No
421	<50	2	Trucking and courier	Yes	Y	Y	Y	Yes
541	<50	2	Grocery Stores	Yes	Y			Yes
805	<50	2	Nursing & Personal Care	Yes	Y	Y		Yes
	>50	2	Ace Hardware	Yes	Y	Y		Yes
	>50	2	Government Agency	Yes	Y			Yes
	>50	2	Fruit Growing	Dec 2002	Y	Y		Yes
	>50	2	High Tech (Fluke)	Yes	Y			No
	>50	2	Hops Growing	Dec 2002	Y	Y		No
	>50	2	Lumberyards	May 2002	Y	Y		Yes
	>50	2	Utilities	June 2002	Y	Y		Yes
	<10	4	Fastener Distribution	Yes	Y	Y		Yes

the “compliance phase” column is based on the employers actually participating in the project – however, all projects in the industry will be of interest to employers in that industry, regardless of size. In addition, lessons in the construction industry can be applied to other construction activities. The 17 projects of particular interest to first-phase employers (including Awareness Education and Commercial Construction, which is not one of the “top 12” SIC codes) are in boldface.

Table 2
Responses to Panel Survey of Demonstration Projects

Industry/Project Name	Surveys	
	Returned	Total
Landscaping and Horticultural	1	2
Residential Construction	2	3
Masonry, Stonework, Tile setting	9	12
Wallboard (Plastering)	6	13
Spilker Masonry	1	2
Carpentry and Floor work (GLY)	0	3
Roofing	2	3
Sheet metal (McKinstry)	1	1
Concrete work (Ferguson)	0	1
Commercial (Lydig)	1	2
Sawmills	3	9
Trucking and courier (Ludtke Pacific)	1	1
Air Transportation (Alaska Air)	0	2
Grocery Stores (Ken's Market)	0	2
Nursing & Personal Care (Bessie Burton)	2	2
Residential Care	1	5
Ace Hardware	1	1
Agency - Dept. of Ecology	1	2
Awareness Education (Toolbox Group)	2	7
Fastener Distribution (Empire Bolt & Screw)	0	1
Fruit Growing	2	2
High Tech (Fluke)	1	2
Hops Growing	1	1
Lumberyards	1	2
Utilities	5	17

The low overall response rate makes it difficult to generalize from these data. A more qualitative assessment is, therefore, provided. For the most part the respondents agreed that the project summaries accurately reported their understanding of the goals, although a number suggested additional language to improve the statement

There was less consensus on whether the projects had achieved their goals, although a number of the responses indicated that the project was not yet complete and therefore they could not make a final judgment. Many respondents added comments to the survey to supplement the information they provided.

The following provides some illustrations from the narrative comments provided in the survey responses that address the objectives of the demonstration project program.

Risk Identification:

“The demonstration project is not complete at this time, but proceeding in a fairly successful manner. The ergonomics rule as well as the masonry trade are both complex. The working group can’t identify all hazards or situations that might be deemed hazardous (masonry).

“The demonstration project has laid great groundwork, a solid foundation, for a successful project. The work that has been done to date has been worth the work (wallboard).

“I believe it has been successful in identifying the risks, but I think it could use more time/effort in identifying how to reduce the risks and also to disseminate information to companies.” (landscaping)

“I believe the task force has made several major mistakes. They have focused too much on tasks that occur infrequently (wallboard).

“We were able to find excellent fixes for most problems.” (trucking)

“It is my opinion there needs to be further study of different facilities in our industry to have a complete analysis of the industry as a whole. We have received some beneficial solutions, and some suggestions that were not feasible.” (apple packing)

“In regards to recommendations made as a result of this demonstration, we have found it difficult to apply engineering fixes to identified or known problems.To apply an engineering fix to a problem identified would potentially create more ergonomic problems when we run the many other types of processes. I believe that to be effective, the demonstration project should take a more longitudinal approach within a variety of packing houses before drawing any final conclusions from their research.” (apple packing)

“Scaffold comparisons for the project will require additional time to gather information on the new scaffold systems.” (scaffolding)

Best Practices/Safe Harbor

“I believe that the project to date has been successful and once the best practices guide is available to the rest of the industry, it will not be long before the results of this work can be measured.” (sawmills)

“Without the determination of a safe harbor, and a means for the small contractors to have reasonable assurance that they are actually in compliance with the rule and will be found by the inspectors and other enforcement personnel to be in compliance with the rule, the demonstration project for drywall is incomplete and the rule will be unduly onerous for small contractors.” (wallboard)

“The safe harbor determinations have not been spelled out and the overall communication with the drywall industry appears to be minimal at best. One of the early goals was communication and I don’t think this goal has been satisfactorily achieved at this point in time.” (wallboard)

“We are working in a successful manner and should be able to achieve our goals.” (utilities)

“The November 2000 report for our group was a great first step in the process, but it is incomplete. The solutions given are often not practical out in the field, and most do not lower the hazards below the levels stated in the regulation. What has become apparent is that this rule as it is cannot be successfully applied to the roofing industry.” (roofing)

“Goals could be improved by gathering information and documentation that could be used to evaluate jobs as a safe harbor.” (concrete forming, pouring and finishing)

Education Materials

“It will take a considerable amount of time to reach everyone in the industry. I’m not at all sure that the information will be successfully communicated to the industry within the department’s time frame.” (masonry)

“The ergonomists from L&I and the University of Washington provided excellent consulting in addition to meeting their project goals, including follow-up meetings with our work teams and supervisors to communicate their results and make recommendations.” (supervisor assessment of risk factors)

A. Summary of Public Comments

The following is an effort to capture the most important aspects of the survey responses. It should be noted that a number of comments included on the survey forms did not address the demonstration project *per se*, but rather expressed a personal view about the ergonomics rule and its ultimate implementation.

Labor Comments

Labor union representatives provided information to the Blue Ribbon Panel at the public forum, via some oral comments at panel meetings, and from demonstration project labor union participant survey responses.

The labor comments were uniformly in favor of the ergonomics regulation in general, and supportive of WISHA's efforts in meeting the four criteria in the governor's letter. Labor representatives indicated that no changes are warranted in the design or implementation of the ergonomics rule. These comments often did not address the demonstration projects although the responses provided in the surveys did generally consider that the demonstration projects were successful and are meeting the stated goals.

Labor's primary message, in all their comments, has been to express alarm at the toll of musculoskeletal disorders on workers, and to support the regulation of ergonomic hazards. Labor argues that the WISHA rule should be given a chance to test itself before it is altered, and they believe that the demonstration projects generally show that compliance is viable for well-intentioned employers.

Business Comments

Representatives of the business community provided information to the Blue Ribbon Panel at the public forum, via oral comments at panel meetings, from a significant number of written comments to the panel, and from demonstration project business participant survey responses.

These representatives often suggested the goals of the demonstration projects should have gone beyond those indicated by L&I and should produce feasible, industry-consensus practices which are written, detailed, specific and offer the safe harbor of compliance to all employers who use them. Some argued that all industries which anticipate having hazard-level jobs needed to have a demonstration project conducted which would produce user-friendly guides assuring compliance.

Some business representatives commented that they believe that the WISHA estimates of compliance costs are significantly below actual costs.

A primary complaint by business is that such comprehensive demonstration projects have been successfully performed in only a handful of industries, whereas they are needed in all industries expected to have hazard level jobs.

As with the labor representative responses, frequently the business community addressed issues that were not germane to the objectives of the demonstration project program's efforts to assess readiness and not actual implementation. For

example, it was suggested that since the clear intent of an ergonomics regulation is to reduce musculoskeletal injuries, a demonstration project should indicate that implementation of the program leads to a reduction in injuries. The burden of compliance should be measured against the savings from reduced injuries, and a determination made that a business does not suffer economic harm as a result of the regulation.

Some business participants reported being satisfied with the results and considered the projects successful in demonstrating the goals identified.

Occupational Health Professionals

Occupational health professionals who participated in the open hearing addressed issues related to the charge of the Blue Ribbon Panel, however, none discussed the demonstration projects.

WISHA Responses

When asked to respond to some of the criticisms of the demonstration projects WISHA reported their belief that, in general, the demonstration projects have been successful. They have devoted very significant resources to the demonstration projects with a number of them planned or on-going at the time of this report. They indicated a willingness to be flexible and open to suggestions from project participants which was generally confirmed, at least, in discussion with those project participants who appeared before the Panel. WISHA indicated that the objectives of the demonstration project plan was not to conduct comprehensive demonstration projects in all industries that anticipate hazard level jobs, but rather to undertake projects that would be instructive in preparing for implementation of the rule.

B. Final Demonstration Project Products - Panel Summaries

The Panel examined all the material received in either oral or written form as well as the survey responses. In addition the goals and results of each individual demonstration projects were reviewed. These inputs were used by the Panel to provide its own summary evaluation of the demonstration projects. Following is a brief summary of those findings and summary evaluations.

Landscaping

Goals

The goals of the project were to demonstrate that employers and employees of landscape companies can identify potential risk factors and hazards covered by the ergonomics rule as well as possible controls that will reduce or eliminate identified hazards in compliance with the ergonomics rule and to disseminate this information to the industry.

Results

The product of this project was a document to help businesses in the landscaping and horticultural services prepare for the new rule. Working with a nursery and landscaping company in Redmond, WA, potential hazardous exposures to musculoskeletal risk factors were identified in a variety of jobs the company performs. Additionally, examples of reducing these hazardous levels were identified. By using the tables provided in this document employers receive guidance in identifying activities performed in jobs or a combination of jobs that pose a hazard for work-related musculoskeletal disorders as described in the Ergonomics Rule.

Evaluation

Although this project has been successful in achieving its goals, more industry involvement would have broadened the scope of the project. Initially, the aim was to recruit employers from several different landscaping companies, with the help of the Washington Association of Landscape Professionals (WALP), to form a working group who would identify WMSDs hazards and potential solutions. Unfortunately, it proved difficult to recruit participants and the focus of the project was narrowed to a single company. This should not, however, diminish the results, since most landscaping companies are of a size similar to the participating company or smaller. Input was also obtained from WALP, which helped to identify industry-wide issues. Limited survey responses supported the effectiveness of the project although there was interest to go beyond the project to explore more settings and to disseminate findings effectively.

Carpentry, Laborers, Rebar And Concrete Finishing

Goals

The goals of this project (combining demonstration projects entitled “**Carpentry and Floor Work (GLY)**” and “**Concrete Work (Ferguson)**”) were to examine the major tasks and non-specialty trades associated with commercial concrete building construction and demonstrate that the employer, working with L&I, can identify likely hazard zone risk factors for formwork, concrete finishers and re-bar workers, identify hazards by task as well as using scheduled weekly safety meetings, to identify possible solutions for mitigation and to test the potential mitigation controls for identified hazard zone risk factors.

Results

A report has been produced that presents sections for hazards associated in construction for carpentry, laborers, rebar work, concrete finishing and hazards experienced in common. The report uses information collected to provide illustrations of common “Hazard Zone” tasks that potentially appear in routine construction operations. Feasible ways for the mitigation of the hazards are also presented. Potential risks common to construction tasks (hand-arm vibration and work with hands above

shoulders) were identified and guidance provided about when these might become hazard zone jobs. Work continues on developing similar information for more carpentry and laborer tasks as well as field testing mitigation of these.

Evaluation

One of the projects was successfully completed and the other is progressing well and is expected to be completed by the end of June, 2002. The information gained should prove valuable for the construction industry, and appears to show that Hazard Zone risk factors are more limited than thought by people in the field. While every specific task was not examined for each trade the approach illustrated should be feasible for the other tasks. While durations and conditions may vary the presence of risk factors can be expected not to vary greatly between those focused on by this project and similar types of construction.

Sheet Metal

Goals

The goals of the demonstration project were to perform an evaluation of all headquarters and shop jobs for the presence of caution zone and hazard zone risk factors, with identification of mitigating solutions for any identified hazard zone risk factors; demonstrate employer evaluation of caution zone risk factors; and identify best practices for dissemination to companies with similar operations.

Results:

This project was completed with identifying caution zone and hazard zone jobs in the office and workplace. Recommendations were made in the abatement of both the caution and hazard jobs. A written ergonomics program and company-specific caution zone checklist were also developed during the project. The McKinstry Company has been recognized as one of the best-run workplaces in Washington (AWB 2000 Workplace of the Year), therefore recommended ergonomic interventions are already in place and contributed to the company being a safe and profitable place.

Project Evaluation

This demonstration project has met the defined goals. Best Practices should be disseminated through training by the trade associations and union. They have developed a written ergonomics program for the company, and a specific caution zone checklist. These items can serve to help similar industries.

Airline Travel

Goals

The goals of this project were to demonstrate that an employer in the air transportation industry, working with employee participation, can identify a job with risk factors for musculoskeletal disorders; determine whether these risk factors reached levels where they would be covered by the

ergonomics rule and/or would reach a hazard level where controls are required; evaluate existing solutions to see if they reduce hazards below the rule criteria, and to identify other potential solutions to reduce hazards.

Results

Airline personnel were able to correctly identify the risk factors in jobs that were caution and hazard zone jobs. They were also able to identify improvements to existing solutions. They also believe that the solutions are applicable to other airlines and airports.

Evaluation

This demonstration project showed that there are several solutions available to any given industry. While the ones identified range from the addition of a person (two-person lift) to engineering re-design of the check-in counters (given a new airport), the team members identified designed out the risk factors. This project was able to identify other solutions for improvements not covered by the rule. With regard to "Evaluate existing solutions to see if they reduce hazards below the rule criteria" was not accomplished because the risk assessments dealt with one high hazard job. Implementation of the corrective actions identified will be the key.

Residential Care

Goals

The goals of this project were to: evaluate jobs in two to three resident houses with the highest demand for client lifting. Determine caution zone jobs and analyze for hazards if indicated; evaluate work practices and controls since implementing a two-person lifting policy and introducing modern lifting equipment to determine their effectiveness in reducing ergonomic risk or WMSD's; compare Rainier School lifting policy and practices with a similar DSHS facility; with employee input, compile a booklet with control recommendations to share best/acceptable practices with the industry and similar workplaces.

Results

Some exposure to heavy lifting and awkward postures to the back were found in these commonly performed tasks: Heavy lifting and back bent exposures occur, but lack the duration or frequency exposure criteria to reach caution zone status. The total duration of back bending involved in the above listed tasks do not exceed two hours per day. Rainier School is using effective controls with policy and procedures in place for more than six years. Mechanical lift devices should be used whenever clients are not able to assist with transfers or cannot bear weight. Rainier School staff should pay close attention to avoid doing full body lifts manually as this will most likely trigger caution zone and hazard zone job status. When this project is finalized, an inventory of the identified best practices will be compiled in a web-based booklet. This will serve as a resource for other residential care facilities or similar workplaces

Evaluation

Residential Care. Rainier has been using controls for over 6 years. Therefore they are in good shape to comply with the rule. They have identified best practices and methods for handling patients. They believe there are opportunities for expansion of the project in other areas at Rainier. Upon completion they intend to compile a web-based booklet, for the industry. They have met their goals.

Residential Construction

Goals

The goals of the project were to determine if there are hazardous jobs requiring attention under the ergonomics rule in residential framing and floor work, to find ways to reduce or eliminate these hazards in compliance with the rule and to share results with the industry through an education/solutions handbook.

Results

Exposure assessment confirmed that workers in each of the three trades -- residential framing, carpet installation and hardwood floor installation -- would be in the caution zone, as defined by the Ergonomics Rule. The findings documented two possible Hazard Zone risk factors to which residential framers may be exposed, three to which carpet installation may be exposed and one to which floor installation may be exposed during regular work. Low-cost solutions of less than \$200 were found that can help reduce the Hazard Zone risk factors. Several jobs, such as wall building and hardwood floor installation, may have Hazard Zone risk factors that still exist after solution implementation. These tasks may need to be evaluated further for solution development and feasibility determination. Further work in this area should lead to additional improvements and a reduction in exposures to risk factors of injury. This ergonomics demonstration project in residential construction, was conducted by the Field Research and Consultation Group of the Department of Environmental Health at the University of Washington. A subsequent final report is expected to provide additional details and clarification.

Evaluation

There is a challenge in this industry due to the small size of crews, smaller amount of resources compared to commercial construction, and sometimes less frequent supervision of activities. The project identified hazard level risk factors found in the jobs studied and determined that many risk factors thought by the industry to be at the hazard level were, in fact, found at only caution zone levels. Furthermore, the project demonstrated that controls exist for many of the hazards studied. Including multiple companies and crews in the project allowed best practices to be identified

and also identified hazards that do not have engineering controls as of this time. Once published, the handbook of solutions should prove to be a valuable tool for the residential construction industry to start sharing practical controls for some of the hazards identified.

Wallboard

Goals

The goals of the wallboard demonstration project were to: familiarize WISHA ergonomists with wallboard industry tasks and familiarize the industry with the requirements of the ergonomics regulation; identify hazard zone jobs in the wallboard industry; identify best/acceptable practices for the wallboard industry that can be used by employers and employees to comply with the ergonomics regulation; develop and distribute a document describing best/acceptable practices for the industry; and provide examples of ergonomic risk factors, hazards and controls to use in WISHA training workshops for the construction industry. All of the products from the project will also be available for industry use to develop training materials.

Results

The report addressing the identified goals has reached tentative completion and is scheduled to be published and posted on the WISHA website in the near future.

Evaluation

The drywall/wallboard industry is one of the first 12 industries scheduled to comply with the ergonomics rule. The industry has a relatively high rate of ergonomic injuries, primarily due to lifting heavy sheets of wallboard, and repetitive, high force use of finishing tools.

Roofing

Goals

The goals of the roofing demonstration project were to: define major roofing activities and hazard zone risk factors for roofing operations by task, and develop a list of technologically feasible solutions; in conjunction with roofing contractors, that identifies possible hazard zone risk factors and options for mitigation for all major roofing tasks.

Results

This project has encountered certain roadblocks due to a lack of the meeting of minds of key stakeholder participants. A draft report identifying hazard zone risk factors by major roofing task, along with suggested compliance solutions, was completed in November, 2000. The report is not publicly available at this time.

Evaluation

This project is incomplete. Remaining tasks include: 1) address lifting hazards during roof loading, 2) risk factor mitigation for hot mopping, and 3) obtaining feedback on the draft report and completing the final report. It appears that key stakeholders are not in agreement as to the success of the project thus far, or how to bring the project to completion.

Lumber Handling in Sawmills

Goals

The goals of the sawmill demonstration project were to: demonstrate that sawmills can identify risk factors and hazards covered by the ergonomics rule; identify ways to reduce or eliminate these hazards in compliance with the rule, share information from the project with the industry through a handbook, education materials and workshops.

Results

The final report and a manual entitled, "Lumber Handling in Sawmills, A Manual to Increase Efficiency and Reduce Injuries," have been published and posted on the WISHA website. Additionally, an employer workshop on "Implementing Ergonomics for Sawmill Employers," available on CD-ROM, was also a product of the demonstration projects.

Evaluation

This has been one of the most successful of all the demonstration projects. Sawmills are among the industries in the state with high rates of ergonomic injuries. Whether a mill produces lumber, fence posts or other materials, handling lumber is physically demanding and hazardous work. WISHA worked exceptionally well with representatives of employers and employees from 5 sawmills. The level of cooperation between all stakeholders was first rate. The results from the project should provide a feasible compliance plan for most sawmills. Educational materials are still being developed.

Awareness Education Toolbox

Goal

The goal of the project was to develop model education materials in a variety of formats that employers could use as is, or could serve as a template for industry- or company-specific materials to be developed.

Results

The project generated a script and examples of risk factors and solutions to use to develop awareness education materials in a variety of media followed by a computer slide show, available on CD-ROM and the L&I web site, that can be used or customized to comply with the awareness education requirements of the ergonomics rule and a video and instructor's

kit that can be used to comply with the awareness education requirements of the ergonomics rule. L&I has determined that it will consider these materials as a safe harbor - if the awareness education materials are delivered as outlined in the instructor's guide, the program will be considered to be in compliance. The materials are also intended for use as examples to guide the development of company- or industry-specific materials.

Evaluation

The Toolbox group appeared to be successful in working together to produce a script and materials that are technically accurate and rule compliant, in clear language. The material is being made available through the L&I website as well as in a form that can be mailed. One measure of success is the fact that the Toolbox Group has indicated that it would like to continue to meet to develop other training materials related to ergonomics. There is some concern that there is need to develop an aggressive "marketing" effort to distribute the materials as widely as possible.

Spilker Masonry

Goals

The project goals were to: demonstrate that specific risk factors and hazards can be identified for the different types of scaffolding being used in the industry; determine the time differences required for use of two-handed (two-person) block laying for 12-inch-wide concrete blocks vs. one-handed (one-person) block laying; identify ways to reduce or eliminate these hazards in compliance with the rule; provide examples of ergonomic risk factors, hazards and controls to use in L&I training workshops for the industry.

Results

Spilker Masonry is continuing to assess their workplaces and focusing on meeting Goals 1, 2 & 3. There has been ongoing access to their worksite, providing the opportunity to photograph and videotape potential risk factors, pictures that have been used in the Implementing Ergonomics for Construction workshop.

Evaluation

This project should be successful because Spilker Masonry has made clear its determination to find ways to reduce risk factors and find better ways to do their work even if complete elimination of hazard zone jobs is not possible.

Commercial Construction (Lydig)

Goals

The goals of this demonstration project were to: demonstrate that the employer can identify risk factors and hazards covered by the ergonomics rule; identify ways to reduce or eliminate these hazards in compliance with the rule; evaluate tasks involved with concrete forming, pouring and finishing; and to share information from the project with the industry through educational materials and workshops.

Results

Lydig has evaluated tasks associated with concrete forming, pouring and finishing. They are currently evaluating the feasibility of both administrative and engineering controls for these tasks.

Evaluation

They have identified risk factors associated with caution and hazard zone jobs. The best practices and education material are still under development.

Trucking and Courier

Goals

The goals of this project were to: identify ergonomic risk factors and hazards covered by the ergonomics rule in the segment of the trucking industry that this company represents -- operations that deal mostly with complete truckloads that are mechanically loaded and unloaded; identify best practices for the trucking industry to reduce or eliminate hazards to be in compliance with the rule; provide examples of ergonomic risk factors, hazards and controls to use in Department of Labor and Industries training workshops for this industry; identify controls to reduce lifting for shop mechanics changing brake drums; assess effectiveness of using automatic pull tarp for reducing risk factors associated with tarping loads; provide awareness education and training to shop mechanics that work in caution zone jobs.

Results

Completed analysis was conducted of shop mechanics related to truck maintenance, truck drivers relating to methods for tarp loads as well as the storage areas. Hazards were identified, but corrective actions were implemented to reduce them. The shop manager and safety officer demonstrated the ability to complete the caution and hazard zone job checklist. Education and training materials are still being developed.

Evaluation

Although this project has been successful in achieving its goals, more industry involvement would have broadened the scope of the project, perhaps with a company that has less mechanization. However this company's demonstration project met its goals and developed best practices that can be shared.

Analyzing Supervisor's Ability to Rate Caution Zone Jobs

Goals

This report consolidates two demonstration projects (“**Grocery Stores**” and “**High Tech (Fluke)**”) along with two government offices within the Department of Labor and Industries. The goals of the demonstration project were to evaluate the reliability of Caution Zone risk-factor assessments by supervisors and to evaluate possible caution zone and hazard zone risk factors and potential solutions for electronics assembly operations, grocery stores, and two government offices.

Results

Thirty-one supervisors and 55 workers at four different workplaces participated: an electronics manufacturing firm, a small grocery store chain, an insurance paperwork processing group, and a distribution warehouse. Results for each were similar. During the project with the aid of employers, a work sampling checklist was developed which can be used to assist in the identification and analysis of Caution Zone jobs by using representative work sampling. The survey demonstrated supervisor ratings of each risk factor that agreed with ergonomist observational work sampling of the jobs over 80% of the time. Supervisors agreed with ergonomists 86% of the time as to whether to categorize the jobs as Caution Zone Jobs or not. Workers in the same jobs also agreed with ergonomist in 75% of the cases. Over 93% of the people evaluated the Caution Zone risk factors in less than 30 minutes even though approximately two-thirds stated that they knew very little or nothing about the Ergonomics Rule.

Evaluation

Supervisors were generally shown to be able to correctly identify the “true” caution zone risk factor when present. Supervisors, though accurate, may tend to be conservative, at times incorrectly assuming caution zone classification of a risk factor where there is doubt. This project showed that supervisors and workers in both small and large companies can evaluate jobs for Caution Zone risk factors quickly and accurately for compliance with the Washington State Ergonomics Rule. The project also demonstrated that hand repetition can be difficult to reduce in some high tech situations without capital expenditure, but in this case, simply enforcing the stated job rotation scheme within work cells could reduce the risk factor below the Hazard Zone.

Nursing and Personal Care

Goals

The goals of this project were to: identify jobs in a nursing home facility that may fall into the category of caution zone jobs and would be covered by the ergonomics regulation; identify jobs with risk factors reaching a hazard level under the rule; therefore requiring controls to reduce exposure; implement modifications to decrease hazards.

Results

A final report on a “Skilled Nursing Facility” has been published and posted on the WISHA website. The report serves as the foundation for a workshop on “Implementing Ergonomics for Nursing Home Employers,” which is nearing roll-out.

Evaluation

The injury rates for work-related musculoskeletal disorders for the nursing home industry are the highest in the state. Manual lifting of nursing home residents appears to be the sole cause for these injuries. A zero-lift program is the optimal solution. Where this fix is not feasible, a team lifting program may serve to comply with the regulation. The demonstration project has been able to address its goals, however, the costs of implementing such a program can be expected to be significant and were not evaluated as part of this project.

Ace Hardware

Goals

The goals of this project were to: show that an employer can identify caution zone jobs; provide awareness education as required by the ergonomics rule; determine which risk factors in caution zone jobs reach hazard levels; and identify and implement controls to reduce employee exposures below hazard levels.

Results

An investment in time and some initial assistance from a risk management specialist was needed for the company to identify caution zone jobs using in-house personnel. It was learned that while team members engage in a number of the motions and postures identified in the rule, in most instances the frequency was less than that required to be identified as a caution zone. As the project continues, the company has become aware that they will need to continue to conduct ergonomic analysis to verify caution and hazard zone jobs as methods change. They have noted positive safety trends, with “recordable” injuries down 43% and lost-workdays down 63%. They are working on an employee education program, to help support the team leaders and front line supervisors with regard to their role in supporting the ergonomics program.

Evaluation

Ace Hardware is in the second wave of compliance but is progressing towards compliance. The work corrective actions and training and education being developed at this Yakima store can and hopefully will be shared with all similar warehousing. The recognition of education and training for the first line supervisors and team leaders to ensure continued support is critical. The project met its goals.

Government Agency

Goals

The goal of this project was to show that an employer can identify caution zone jobs without having ergonomic expertise and to demonstrate that the results were comparable when agency staff and Department of Labor and Industries' ergonomists identify caution zone jobs at the agency.

Results

There was high agreement between the employer and the Department when evaluating 5 jobs relevant to the 14 caution zone risk factors. The agreement was 96%.

Evaluation

Several research projects have shown what this project was also able to show, you can train non-ergonomists to identify risk factors in the workplace. The type of job does not limit the results to only state government workers. They are in the second wave and therefore should be on target for implementation of the recommendations made during this project.

Fruit Growing and Packing

Goals

The goals of the fruit growing and packing demonstration project were to: identify caution zone jobs in orchards and packinghouses; determine risk factors that are likely to reach hazard levels; identify and implement controls for these hazards in order to comply with the ergonomics regulation; work with the Department of Labor & Industries to identify technological and economic feasibility issues that may affect the types of controls that can be implemented.

Results

A checklist for analyzing jobs within the industry has been completed and posted on the WISHA website. Other important goals of the project are behind schedule.

Evaluation

Many of the jobs in this industry involve ergonomic risk factors, particularly repetitive motions and frequent, awkward lifting. Although there have been some advances in the mechanization of certain tasks in this industry, the business still relies heavily on manual labor. Engineering controls may not be technologically feasible for some tasks. Most fruit can only be picked by hand, under serious harvesting time constraints. Awkward postures may be unavoidable in some instances. A key participant in this demonstration project believes that the effort has been unsuccessful. It may be advisable for WISHA to redesign this project in order to achieve success.

Hops Growing

Goals

The goals of this demonstration project were to: show that a hops grower can identify caution zone jobs and determine which ones are likely to reach hazard levels; use existing controls and best practices to reduce hazards in order to comply with the ergonomics rule; and develop new ideas for best and acceptable practices to address hazards.

Results

The project began with an evaluation by Department of Labor and Industry ergonomists of steps that the company had already taken to reduce risk factors during harvest, which included mechanization of several processes. A few jobs with risk factors were also noted during the evaluation. The project then went on to evaluate the seasonal jobs of digging up hop roots for transplanting, tying up the lengths of twine that the hop vines grow on, and training the young vines to grow up the twine. Caution and hazard zone jobs were identified as well as simple solutions for the hazard zone jobs. A few more jobs, such as burlap sorting and some of the harvest tasks, still need to be evaluated and solutions chosen. In addition, meetings are being scheduled with the help of the hop industry association in order to recruit other hop growers to join the project. This will help in generalizing the findings of the project and ensuring that the controls identified will work for growers of all sizes. The feasible controls that have been chosen still must be evaluated in the field, and workers need to be involved in reviewing the project's findings and evaluating the controls. Once the project has successfully covered the jobs that are a concern to the industry, a final report will be written and distributed through the industry association.

Evaluation

Hops Growing is in the second group of industries subject to compliance with the rule but appears to be progressing toward a finished product prior to their compliance deadline. It will be critical to implement the controls so that they can determine what will and will not work, but there is time to accomplish this.

Lumberyards

Goals

The goals of the lumberyards demonstration project were to: identify caution zone jobs in lumberyards, provide awareness education to employees in caution zone jobs; and to their supervisors; work with employees to identify ergonomic hazards in these jobs and identify feasible controls; and to implement controls and evaluate their effectiveness at reducing the hazards.

Results

This project is not scheduled for completion until April 2002. There are no preliminary materials for analysis.

Evaluation

Lumberyards combine the elements of a retail environment, warehouse and delivery trucking in one industry. The relatively high rate of ergonomic injuries in lumberyards is due to heavy, frequent and awkward lifting while helping customers and delivering large, heavy items to construction sites.

Utilities

Goals

An ongoing group of representatives of the electric, gas, and water utility companies from the western U.S. (Western Utilities Ergonomics Group - WUEG) was formed to address common musculoskeletal problems found within their industry. The group decided to work together to address the Washington rule despite membership by non-Washington state companies. The goals of the demonstration project were to develop an acceptable method to measure ergonomic risk exposure applicable for difficult jobs within the utility trades; to recognize when to use caution zone job/hazard zone job checklist methods; to complete job analysis of 15-20 utility jobs; to identify possible solutions to reduce the exposures below hazard levels and to establish appropriate safe harbors as needed. After the demonstration project is complete, WUEG expects to continue to function as a working group to develop a database with their ongoing job analysis

Results.

The L&I ergonomist worked with the project team to develop an evaluation method that could be used for jobs that are difficult to characterize. The method introduced job components as categories of work activities that are often based on a worker's relative location. In this industry, it is easier for workers to account for their workday hours by the larger components than by individual tasks or work activities. Completed Caution Zone Checklists have been developed by the project team for jobs based on the range of tasks typically performed by workers with these job titles and their exposure to the 14 physical risk factors listed in the Washington ergonomics rule. These checklists are intended as examples to provide guidance regarding jobs at the participating facilities or for similar jobs outside of the utility industry. Employers will need to examine the checklist and make some determination as to whether the completed checklist well represents the job classifications at their own facilities.

Evaluation

Completion of all of the goals is now expected by mid-year. Slower progress than might have been true for more circumscribed projects may

be explained by characteristics of the working group due such as: infrequent quarterly meetings, multiple company membership, changes in membership, data collection depends on work schedule, and the demonstration project is not the sole purpose or priority of the group/meetings. It cannot yet be determined how successful the demonstration project will be but it is expected that the goals will be accomplished and that these can be successfully evaluated.

Fasteners

Goals

The goals of the fasteners demonstration project were to: identify caution zone and hazard zone jobs as defined in the ergonomics regulation; identify engineering and administrative controls to eliminate hazards; and to identify additional controls that could be used to improve comfort and productivity even though the regulation did not require this.

Results

A final report entitled, "Controlling Musculoskeletal Hazards in the Fasteners Industry, Lessons from Empire Bolt & Screw," has been published and posted on the WISHA website.

Evaluation

Most US fastener companies import the products, and repackage, sell and distribute to the domestic market. Heavy lifting and high hand force are common hazards in the industry. WISHA assessed the jobs at Empire, and worked with the company to reduce ergonomic exposures below the hazard level. Generally, feasible solutions were found to most of the hazards. Although this project has been successful in achieving its goals, more industry involvement would have broadened the scope of the project. The final report should assist other employers in the industry to develop a compliance plan.

III. Panel Summary Assessment of the Demonstration Project Program.

The demonstration projects had a rather limited objective, to provide concrete *examples* by and for employers on how to comply with the rule in order to demonstrate an adequate understanding of the rule. It appears that a great deal of concern about the implementation of the ergonomics rule colored the responses to the assessment efforts. When the public comments and survey responses are examined for responses that directly address the objectives of the demonstration project program, however, in general the projects appear to have achieved their goals. Both the participants and WISHA staff have learned a great deal and the process has led to the identification of certain industries where simple ergonomic solutions may not be possible, for example, apple picking and roofing. This, in turn, has led to efforts to develop best practices or safe harbor recognizing that the approaches will not

necessarily achieve reduction in risk that was originally intended. Still the work environments should have improved ergonomic characteristics and a better understanding by individuals about what they can do to reduce risks.

Blue Ribbon Panel on Ergonomics

Final Report

March 1, 2002

Attachment

The following letter, with attached survey, was sent to the demonstration project participants:

October 1, 2001

To: *WISHA Ergonomics Demonstration Projects Participants*

>> Deadline: Friday, October 26, 2001

On May 25, 2000, Governor Gary Locke established an independent blue ribbon panel to address issues related to the new WISHA regulation on ergonomics. Among other things, Governor Locke asked the panel to assess whether the WISHA demonstration projects have been successful.

The blue ribbon panel has been meeting for a number of months and intends to issue a report of its findings early in 2002. In order to gather information relevant to our assessment, the panel has decided to conduct a survey of the demonstration project participants. We ask that you invest the time necessary to fill out the attached survey. Your responses will be indispensable in assisting the panel to write a useful and informed report. Please note that the results of this survey will be public information, and if there are responses that you wish to keep proprietary, you should keep such information out of your answers.

You may note that the survey is brief and flexible. We are most interested in whether you believe that the project has been successful, and your reasons for this opinion. Please use your own criteria for the definition of "success." You may use additional pages to respond, if necessary. Any specifics which you can provide as the basis for your opinion would be most helpful.

Attached you will find WISHA's summary sheets of your demonstration project. Please review this material for accuracy, and so you can answer the second question in the survey. For your information, a copy of Governor Locke's letter, as well as the press release about the blue ribbon panel, is also attached.

NO LATER THAN FRIDAY, OCTOBER 26, 2001, please send your completed survey and any feedback you have on the project summary sheets to Rick Goggins at WISHA as follows. Your survey results will be transmitted, in the original, to the blue ribbon panel prior to our meeting on Nov. 1 & 2, 2001.

*Rick Goggins, Ergonomist
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Thank you.

*J. Claude Golden
Chair, Demonstration Project Subcommittee
Blue Ribbon Panel on Ergonomics*

WISHA Demonstration Projects
-- PARTICIPANT'S SURVEY --
Blue Ribbon Panel on Ergonomics

1. Your Ergonomics Demonstration Project
 - a. Your name:
 - b. What is the name of the Ergonomics Demonstration Project you have been involved with?
 - c. What is the name of the business, union, group or association you represented for the Ergonomics Demonstration Project?
2. Ergonomics Demonstration Project Goals
 - a. Do you think that the project goals provided in the attached Ergonomics Demonstration Project Summary are stated correctly?
 - b. Is there anything that you wish to add to improve the statement of goals?
3. Success of the Ergonomics Demonstration Project.
 - a. Do you think that the project has been successful in achieving the stated goals or, if the project is not yet completed, do you think it is proceeding in a successful manner?
 - b. If your answer is no, please explain
 - c. Is there any aspect of the project success or progress that you would like to add to the description provided?

B. EDUCATIONAL MATERIALS

I. Introduction

The second criterion the Panel was asked to consider concerns the availability of effective education materials. The Panel finds that the Department has made an extraordinary effort to inform and educate employers about the Ergonomics Rule. A summary of the Departments Ergonomics Education Outreach Plan finds that a series of educational workshops have been given by or facilitated by department staff. These include the *Start With The Basics* workshop, the *Implementing Ergonomics for Employers* workshop, the *Office Ergonomics* workshop, the *Implementing Ergonomics for the Construction Industry* workshop, the *Implementing Ergonomics for the Sawmill Industry* workshop, and new industry-specific workshops for the nursing home industry, the grocery industry, the landscape and horticultural industries, and the transportation and air courier industries. These workshops now number in the hundreds with several thousand trainees. The department has also provided train-the-trainer workshops for industry specific groups and provided employers and employees the opportunity to acquire workshop content via the Internet or through the use of CD-ROMs. Evaluations of these workshops have included usability testing and/or formative evaluations, pre/post test measures, and post workshop reaction evaluations. Evaluations were provided and described as very positive showing significantly improved participant knowledge of ergonomics and the requirements of the ergonomics rule in all industries. While our principal conclusion is that L&I has been successful in all three areas, we also have several recommendations for improvement. In this section of the report we first describe the evidence we examined along with our activities.

With regard to effectiveness, the Panel reviewed the available objective evidence from the questionnaire evaluation of the department's basic two and four-hour workshops to assess whether they effectively conveyed knowledge and comprehension of the rule's requirements. The Panel also reviewed L&I's other educational and training materials including industry-specific workshops, slide presentations, videos, manuals and other publications as well as technical assistance aids such as the job checklists, lifting calculator, and industry guides. The Panel considered whether these materials incorporated well-established principles of educational design and effective adult learning.

With regard to availability, the Panel reviewed the means and methods used by L&I for the distribution of its educational and training materials. The Panel considered methods of active dissemination, such as mail and personal contact, as well as passive access such as the Internet and video library. The Panel also noted the mix of media and formats used by L&I. Special attention was paid to availability and access for the roughly 600 employers covered by the rule's first effective date.

With regard to understandability, the Panel considered the results of the formal workshop evaluation and the results of several demonstration projects. The Panel, consisting of

some members with considerable experience with regulations and others with very little, also applied its own judgment to this question.

In addition to reviewing the actual educational materials and the data on workshop effectiveness, the Panel also considered other testimony and submissions provided by L&I as well as business and labor representatives.

II. Summary of L&I Efforts to Make Effective Educational Material Widely Available

The educational and training materials developed by L&I for implementation of the ergonomics rule fall into four distinct groups. The first group includes information about the rule's requirements such as the "Start With the Basics" workshop. The second group includes the L&I products that employers can deliver to employees to comply with the rule's basic ergonomic education requirements. The third group consists of materials for technical assistance such as the lumber handling guide for sawmills, the interactive lifting calculator and the caution zone and hazard checklists. The fourth group consists of materials providing useful information about ergonomics that is less directly related to the rule, such as the publication on "Your Body, Your Job, Preventing Carpal Tunnel Syndrome and Other Upper Extremity Musculoskeletal Disorders."

Group One: Information and Education About the Rule's Requirements

- L&I has trained instructors in each of its six regions to deliver interactive workshops on Implementing Ergonomics for Employers. The initial version was a two-hour "Start With the Basics" workshop, first offered in October 2000. This was expanded to a four-hour workshop on "Implementing Ergonomics for Employers" in January 2001. These workshops are available through a scheduled catalog or by special request. L&I offers on-line workshop registration. These workshops provide basic information on the requirements of the rule. They also train participants to evaluate jobs and to recognize caution zone exposures and hazards. They combine didactic slide presentation, video job analysis, and question and answer. These workshops have been given more than 130 times to a total audience of more than 3000 people. L&I has recently completed industry specific versions of the basic four hour workshops for Sawmills, Construction, Nursing Homes and Landscape/Horticulture. Additional workshops for Grocery Store and Trucking Employers are being completed. L&I also offers a workshop on Office Ergonomics that was originally developed prior to adoption of the rule and was revised in May 2000 to be consistent with the new rule.
- Presentations: A basic informational presentation is available for direct use or downloading from the Internet. There have been approximately 40,000 visits to L&I's ergonomics website, but L&I has not provided an exact count of website visits that specifically accessed this presentation. In addition, L&I has prepared instructors in each region to give presentations or to lead discussions ranging

from fifteen minutes to an hour on request to organizations in their area. There have been approximately 150 of these community outreach presentations, attended by more than 2500 people.

- Factsheets and booklets: Several short informational documents are available both in print and electronically. These include “Commonly Asked Questions About Ergonomics,” “The ABC’s of Compliance with the Ergonomics Rule,” and “General Information About Washington State’s Ergonomics Rule.”
- The most detailed explanation of the ergonomics rule is the “Concise Explanatory Statement” that was published at the time of the rule’s adoption and is available on the Internet.

Group Two: Basic Ergonomics Awareness Education

- In April 2001 the ergonomics awareness education kit and instructors guide was added to the ergonomics website. This fully meets the basic awareness education requirement of the rule and is a safe harbor for employers who do not choose to develop or purchase their own program. This safe harbor was available more than one year before the first group of employers was required to provide the education.
- In January 2002 the ergonomics awareness education kit and instructors guide was made available in CD-ROM format. L&I regional staff have been distributing these to the approximately 600 employers who must complete the awareness education by July 2002.
- In January 2002 L&I completed a thirty-minute video that can be used by an employer to fully meet the basic awareness education requirement of the rule and is another safe harbor for employers. The initial printing was for 500 copies. These will be provided to employers without cost and may be freely copied.

Group Three: Technical Assistance

- The L&I ergonomics website has an interactive lifting calculator that can be used to determine whether lifting jobs meet the Appendix B criteria for hazardous exposure
- The website also includes checklists for use in determining whether jobs are in the caution zone or meet the Appendix B criteria for hazards. These may readily be copied and used in the workplace.
- Nineteen of the ergonomics demonstration projects now have reports or other products that have been completed and posted on the ergonomics website. Several of these provide industry specific technical information on hazard identification and control. These include Lumber Handling in Sawmills, Ace Hardware, Masonry Industry, Wallboard Industry, Landscaping Industry, Mechanical Contractor Shop and Carpentry, Laborers, Rebar and Concrete Finishing.
- L&I safety and health consultants have made more than eighty on site visits to workplaces at the request of employers to provide assistance in preparing for the

rule. Consultation visits are one of L&I's basic services and will increase in numbers as awareness grows and the effective dates get closer. These technical assistance visits are free and carry no risk of citation or penalty, unlike compliance inspections.

- L&I is developing an interactive and searchable web-based Ergonomics Controls Inventory and Databank. This is still in the prototype stage.
- L&I is also developing a pocket handbook with tips for evaluating jobs for the presence of caution zone risk factors and with tips for reducing exposures

Group Four: General Ergonomics Information and Education

- L&I has numerous ergonomics publications that were not specifically designed to convey information about the ergonomics rule but are consistent with the rule and may help employers to identify and control hazardous exposures. In several cases L&I has added an insert concerning the requirements of the rule to these general publications. These include the following six booklets: Fitting the Job to the Worker, an Ergonomics Program Guideline; Lessons for Lifting and Moving Material; Office Ergonomics, Practical Solutions for a Safer Workplace; Frequently Asked Questions (FAQs) about Portable Total Body Patient/Resident Lifts; Frequently Asked Questions about Sit-to-Stand Patient/Resident Lifts; and Your Body, Your Job, Preventing Carpal Tunnel Syndrome and Other Upper Extremity Musculoskeletal Disorders (available in English, Spanish and Vietnamese)
- L&I also has several shorter pamphlets and factsheets on ergonomics including: Quick Tips for Lifting; The Backbelt Fact Sheet; Work Related Musculoskeletal Disorders FAQs; and Ergonomics, Keeping Workers Healthy.
- The L&I ergonomics website contains over 50 links to other ergonomics resources including a variety of checklists and calculators, professional organizations, best practices, specific products and case studies.
- L&I maintains an occupational safety and health Video lending library. Hundreds of videos are listed in L&I's video catalog and can be borrowed by Washington employers. Most include written instructor guides and handouts. Since May 2000 L&I ergonomists have reviewed and approved 50 ergonomics videos for distribution. From November 2000 to December 2001 these videos were shown 714 times to 9,762 people.

III. Assessment of effectiveness of educational material

Ergonomics Workshops: L&I has undertaken a systematic evaluation of the four-hour ergonomics workshops described above. The objectives of these workshops included enabling participants to:

- Identify and assess caution zone jobs
- Identify and analyze WMSD hazards
- Introduce ergonomics controls to their workplaces

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Post workshop assessments and comments have been conducted with all of L&I's ergonomics workshops. For example, comments in the *Start With the Basics* two-hour workshop in January-March 2001 identified the need for more emphasis on identifying hazards and solutions, and more industry specific materials. This was incorporated into the 4-hour workshops.

At the request of the Blue Ribbon Panel Subcommittee on Education, L&I initiated pre- and post-workshop evaluations for the four-hour workshop that assessed changes in perceived utility and specific knowledge. Between June 27-November 29, 2001, pre and post questionnaires were available for 232 of 282 participants who completed the 4-hour workshop "Implementing Ergonomics for Employers." These were evaluated by S. Shah, Ph.D. and colleagues with L&I's Safety and Health Assessment and Research for Prevention (SHARP) program. Data from the report (SHARP Technical Report 68-1a-2001) was provided to the Education Subcommittee in December 2001, and the report was provided in January 2002. Major findings are summarized below.

Knowledge was assessed with three true/false questions specific to the ergonomic rule's requirements and one question regarding identifying solutions for lifting hazards. Self-assessed ability to implement the rule's requirements was determined by four questions. These covered identification of caution zone jobs and hazards, understanding of the requirements for ergonomics awareness education and the ability to introduce ergonomics solutions into the workplace. There were five additional process questions covering the quality of the instructors and materials as well as an overall assessment. Participants also provided suggestions for improvement. Information on industry and previous ergonomics training of participants was also obtained for use in stratified analysis.

Workshop participants were from around the state (all six regions) and all 10 major industry sectors. Wholesale Trade and Mining was poorly represented, although it is possible that they were included in the 33% that did not provide industry sector information. These industries are not in the first group of employers required to implement the rule.

A modest percentage of participants had attended any previous ergonomics training (17% Start with the Basics, 11% Office Ergonomics, 16% Introduction to Ergonomics, 6% other ergonomics. These are not mutually exclusive).

Knowledge transfer: There were statistically significant improvements in knowledge of the rule's requirements (pre 50% to post 74% on caution zone, pre 78% to post 83% on no injury requirement, pre 32% to post 45% on Appendix B use) and in identifying solutions for lifting hazards (SHARP Report Table 1). Of particular importance is the improvement in the quality of responses to the lifting question (administrative to engineering solutions) where pretest scores started at an average of 2.5 while post scores improved to an average of 4.0 (maximum=6) in the paired analysis. There were a number of participants that did not answer the knowledge-based questions in the pre questionnaire that answered the questions in the post questionnaire. They were not

included in the paired analysis. It is reasonable to assume that these initial nonresponders did not respond because they didn't know the answer but did respond after the training. The improvements in the paired analysis would then be an underestimate. For those who had attended previous ergonomics courses, the improvement in knowledge of rule requirements was not statistically significant. However, even this group had a substantial and statistically significant improvement in knowledge about solutions for lifting hazards (from 2.9 to 4.6 for Overview participants, from 2.8 to 3.6 for office ergonomics participants, from 2.8 to 4.0 for Introduction participants, from 3.8 to 4.9 for other ergonomics training), SHARP Report Table 2D.

Even though there was significant improvement in knowledge that the L&I hazard zone checklist (Appendix B of the rule) is not the only acceptable way to evaluate the caution zone jobs, a substantial proportion of participants did not appear to know this at the end of the workshop. This suggests that the instructors should give more emphasis to alternative methods to assess hazards in the workshops. The rule gives examples rather than an exhaustive list of alternative methods. Use of some of these alternative methods may require a higher level of knowledge than is necessary for using Appendix B. While not essential, the department should consider providing additional training to WISHA trainers in the use of at least some of these alternative methods.

Perceived ability to implement the ergonomics rule: There was substantial and highly statistically significant improvement in participants' perceived ability to a) identify caution zone jobs (from 62% pre to 93% post), b) identify WMSD hazards (from 52% pre to 94% post), identify requirements for awareness education (from 53% pre to 91% post) and introduce ergonomics solutions into the workplace (from 60% pre to 94% post) (SHARP Report Table 4). These significant improvements were observed for those both with and without previous ergonomics training. The only exception was for introducing ergonomics solutions among those who had already attended the Ergonomics Rule Overview and started substantially higher (69% pre to 95% post, $p < 0.18$). Although the numbers per industry sector were too small for statistical analyses, the percent improvement for agriculture, construction, manufacturing and service showed the same substantial improvement in perceived abilities for all four areas (including introducing ergonomic solutions), SHARP Report Table 9.

The industry specific versions of the workshops have not yet been analyzed. However since the only difference between these and the generic version is that industry specific examples were added, it is reasonable to conclude that the effectiveness of these enhanced workshops will be increased or at least undiminished.

Other L&I ergonomics educational materials: Other than the workshops, the educational materials described above have not been systematically evaluated. However, the Blue Ribbon Panel has examined most of these materials. Using their professional experience and expertise Panel members informally benchmarked these against their knowledge of contemporary best practices in educational design and adult learning. Features that were considered included clarity of language and logical structure, use of

imagery and graphic design, interactivity, integration of concepts and examples, and appropriate use of media.

The following products were ranked as highly likely to convey useful information in an effective fashion and to encourage behavioral change if used properly: Basic awareness education video; basic awareness education kit and instructor's guide (both CD-ROM and Internet versions); interactive lifting calculator; the lumber handling manual for sawmills; and the caution zone and hazard checklists. The ergonomics website itself has been designed to be accessible, understandable and informative. The web-based ergonomics controls inventory and databank has great potential to be an effective means of sharing useful information, but it is still in prototype form and cannot yet be evaluated.

Several other products were judged to be useful and probably effective, but lacking in one or more elements. These included the web-based informational PowerPoint presentation on the rule; the videos from the lending library; the reports from the masonry, wallboard, and landscaping demonstration projects; the booklets with FAQ's on lifting devices for nursing homes. The demonstration project reports appear particularly promising but most still have more of the character of technical reports than educational materials. Materials that are the least likely to be effective are the booklets, fact sheets and reports that are available only on paper and are not integrated with workshops or other training activities.

IV. Assessment of availability of educational materials

Availability of educational materials was assessed in three ways.

First, the Panel reviewed the methods used by L&I to distribute materials and communicate their availability. L&I has used a wide variety of formats and technologies to make materials available to the employer community. This strategy appears to be based on the correct understanding that different organizations and individuals seek and find information in different ways. While L&I has clearly embraced modern Internet based technology for sharing information, it has supplemented this with video formats that remain very popular for workplace based education as well as CD-ROM and more traditional paper based formats. In addition to making information and materials readily available to those who actively seek it out or otherwise learn of its existence, L&I has also gone to considerable length in actively informing the business community about educational materials and activities.

- A four-page flyer with basic information about the rule and with the schedule of workshops has been mailed quarterly to 10,000 employers in high-risk industries beginning in January 2001.
- During 2001 L&I staff made presentations of 30 minutes or longer to 148 organizations with special emphasis on Chambers of Commerce, Economic Development Councils, trade associations. These were attended by more than 2200 persons.

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- L&I has used the press as a vehicle for increasing awareness of educational materials and activities. An initial press release was sent statewide at the time of the rule's adoption. Two additional press releases were sent statewide in August 2000 ("Ergonomics activities in motion following rule adoption" and "Ergonomics and Washington State's Ergonomics Rule.") Twenty-four press releases in specific local media markets were sent in September 2000 to announce the *Start with the Basics* two-hour workshop. A statewide release on the availability of ergonomics videos was sent in December 2000. Eight news releases about workshops were sent to local media markets in August 2001.
- A letter and workshop announcement went to more than 30 construction trade associations asking them to notify their membership about workshops and to consider co-sponsoring a workshop.
- A letter and flier was sent to all sawmills in October 2001 inviting them to attend the new sawmill workshop
- Special efforts have been made to bring awareness of the rule and the department's educational offerings to the approximately 600 employers who are covered by the rule at the first implementation date. A basic information packet was sent to each of these employers in November 2000. Regional L&I staff followed this up with individual calls offering educational and technical assistance services. More recently regional L&I staff have been sending copies of the basic awareness education kit on CD-ROM to these employers. By April 2002 almost every one of this first group of employers will have received information or direct services individually.

Second, the Panel considered the numbers and diffusion of materials. These numbers have been discussed above: 10,000 informational brochures mailed quarterly; nearly 150 presentations to key organizations; more than 130 workshops with more than 3000 attendees; 714 video presentations to 9,762 people; 2600 hits a month on the ergonomics website.

Third, the Panel considered the evidence that L&I activity and materials have stimulated private sector educational efforts. While there has been no systematic survey of these activities, L&I is aware of the following: Employers Northwest Resources, Inc. developed a Train-the-Trainer workshop for the Washington Health Care Association for member nursing homes and adult residential care facilities based on L&I materials and the nursing home demonstration project. These train-the-trainer workshops were first delivered around the state in the fall and winter of 2001-2002. The Timber Operator's Council Management Services is using the manual from the sawmill demonstration project for the training of their member sawmills. The Washington Food Industry has developed a computer-based module for ergonomics awareness education and received a letter from L&I designating this as a safe harbor. The Associated General Contractors is working with a private consultant to develop a series of educational modules that will comply with the awareness education requirements. The Boeing Company has developed a video that L&I has recognized to be in compliance with the basic awareness education requirements. Several private consultant organizations and professional associations

including Clayton Associates, Prezant/Stewart Associates and the Evergreen Safety Council now to offer training and education to prepare employers for compliance with the ergonomics rule. The University of Washington has presented a full day symposium on ergonomics best practices with presentations on the ergonomics rule by several employers. For the past two years there have been multiple presentations and panel presentations about the ergonomics rule at the Governor's Industrial Safety and Health Conference, attended by 2500-3000 delegates.

V. Conclusions

Conclusions: The Panel has concluded that the educational materials are effective and widely available. This is not to say that *all* the materials developed by L&I are demonstrably effective, that *all* affected employers have been made aware of the rule or the available educational materials, or that *all* employers will find it easy to understand the rule's requirements without assistance. It would not be appropriate to hold the department to such a standard of near perfection. It is appropriate, however, for the Panel to hold the department to a very high standard measured both qualitatively and quantitatively. We have done that and we conclude that L&I has been successful not because the bar has been set low but because the level of performance has been quite high.

Suggestions: The following suggestions are made in an effort to further the objectives of the Department as it continues to develop materials and present training workshops.

1. L&I should continue pre-post questionnaires for 4-hour workshops. L&I should also consider adding several more knowledge related questions regarding solutions for hazards other than lifting. This will help trainers to identify where the workshop training needs to improve. There is a tradeoff between how many questions can be included in the questionnaire and response rate. An alternative approach would be to alternate between workshops or within workshops, the specific hazards for which solutions are identified.
2. The Panel suggests that additional training for workshop trainers be provided on alternative hazard analysis tools so they may be integrated into the workshops. While this is not essential for rule implementation purposes, it would more effectively get the message across that there are acceptable alternatives to Appendix B.
3. The Panel suggests that L&I expand efforts to reach labor unions and employees with educational materials and training opportunities. This is particularly important because the rule includes provisions for employee involvement. Most efforts so far have been directed at employers and employer organizations. While this has been useful and important, it is not sufficient.
4. L&I should actively encourage trade associations, unions and other organizations to develop materials designed specifically to meet the needs of their members.
5. The Panel advises L&I to pay special attention to the educational and training needs of small businesses, especially those in the highest risk industries.

6. The Panel urges L&I to make significant efforts to complete the design of the Ergonomics Controls Inventory and Databank and to populate it with examples. L&I should make active efforts to encourage employers and employees to contribute to this effort.

C. UNDERSTANDABILITY OF THE RULE

The Ergonomics Rule deals with subtle questions about the likely health effects of an enormous range of physical activities in an immense variety of the state's industries including services, manufacturing, construction, wood products, health care, retail sales, and state and local government. To address this diverse range of matters in a discerning way, a regulation will necessarily be complex. And complexity will almost always mean that the rule will not be quickly and easily understood. As in any complex regulatory regime, a rule may be perfectly clear but still difficult to understand without time and effort. Obstacles to understanding of this kind cannot be wholly avoided; a certain level of complexity is the price we pay for fine-grained and nuanced regulation. The immediate understandability of a posted highway speed limit is simply not available when regulation seeks to deal intelligently with a subject of some complexity.

Obstacles to understanding caused by lack of clarity is another matter. Rules should be clear. Rules with internal inconsistencies, inexact word choice, poor organization or jargonized expressions are always subject to criticism.

It is our view that the Ergonomics Rule—while in some respects complex—is nevertheless clear. The Panel members with the most prior experience with federal and state safety and health rules were the most impressed with the clarity of the ergonomics rule. The language of the rule is unusually free of bureaucratic and legal jargon. It is obvious that considerable effort was devoted to putting the rule as closely as possible in plain language. There may be those who disagree with the policy of the rule or who may be daunted by its complexity. But in our view that cannot be grounds for objection to the rule as unclear.

To begin with, ergonomics is not a wholly unknown subject in this state. Preliminary analysis of the 2001 SHARP survey of employers (n=5,600) provides information concerning employer perceptions and behaviors at this early stage (2001). In general, survey results show that there is a substantial level of knowledge and activity among employers of all four employer size groups (top 12, remaining large employers, small medium employers, and all others). Over 40% of all employers (ranging from a high of 82.7% among the largest employers to a low of 35.4% among the smallest employers) had taken steps to prevent or reduce musculoskeletal injuries. Eighteen percent of all employers (ranging from 45.2% among the largest employers to a low of 15% among the smallest employers) reported having established an ergonomics program. Among those with health and safety committees (n=2397) at least 50% of each group (64.6% overall) reported committee activity addressing ergonomics issues in their workplace.

The clarity of the rule was specifically evaluated at four workplaces: a grocery store, a manufacturing facility, a warehouse and an office. Thirty-one supervisors and fifty-five employees were asked to complete caution zone job checklists on multiple jobs. These results were compared to assessments by two L&I ergonomists. The supervisors and employees had no prior ergonomics training and little prior knowledge of the ergonomics rule. Agreement on job classification was approximately 86% overall. Where there were differences, supervisors were somewhat more likely to identify a job as being in the caution zone than the ergonomists. However, results for each of the worksites were roughly the same. These findings demonstrate that the rule was reasonably clear to supervisors and employees and also that the rule was usable in a practical sense in the field. These findings were evaluated in detail as part of a University of Washington Master's thesis and have been submitted for publication.

In addition, the workshop evaluations conducted by the Department to gather participant input provided quantitative and qualitative information about understandability. A large proportion of workshop participants correctly identified several essential rule requirements prior to the training. The greatest post workshop improvements were related to identification of solutions rather than understanding of the rule itself. Also, comments submitted along with the questionnaire frequently indicated that the participants were surprised by how easy it was to understand the rule when they went through it in a thorough manner.

The rule contains, of course, some general terms whose meaning is not self-evident. It contains words such as "reasonable," "appropriate," and "technologically and economically feasible." Terms such as these seem to us inevitable parts of a rule treating a subject which subsumes a considerable range of variations. Use of a broad principle gains for us a degree of adaptability and flexibility, and the ability to fashion solutions which respect the differences among problems.

As valuable as flexibility is, achieving it by the use of general terms does cost us something in certainty, predictability and consistency. In the case of this rule, we think these costs are minimized by several factors. First, there is the Department's policy statement (the WRD), described below, which contains much more specificity about how the Department will interpret the rule and the kinds of factors and attitudes which will inform the inspection process. We applaud the Department's use of this kind of guidance to the public and we do not believe that the WRD should be put in official rule form. It needs to stay flexible until some experience has been accumulated and, in any event, it has already been the subject of significant public comment in the long drafting process. Moreover, as with any application process that begins with necessarily general standards, experience will soon begin to generate more refined principles and decisional patterns, giving affected parties increasingly clearer and increasingly predictable views about the meaning of the general terms.

Finally, it is to be expected that however insistent the Department comes to be about strict application of the rule, its early interpretation is likely to be sensitive to good faith

efforts to comply with the spirit of the rule. From our conversations with Department officials, we think surprises and exotic or novel interpretations are not likely.

Regulation involving general principles may pose special resource problems for smaller business units. We have received many comments about the generality of the language in the rule, and the most persuasive come from small businesses, concerned about whether they have the resources and the technical ability needed to evaluate repetitive motion activities in the level of detail contemplated by the rule.

The Panel's concludes that there is sufficient evidence that the rule's requirements are understandable. The Panel urges the Department to pay particular attention to the concerns of smaller businesses as quickly as it can, once actual application of the rule begins to make further clarification possible. In the meantime, we encourage the Department to make available to all businesses reliable advice about the rule's requirements. The rule itself requires the Department to work with employers to devise compliance guides, best practices, demonstration projects, etc. WAC 296-62-05160. and we believe such advice should be generously available, and without risk of an employer being subject to enforcement action as a result of inquiry. Further, we recommend that to the extent that it can be done consistently with the public health and safety interests, the nature of these uncertainties—especially as they impact smaller businesses—should be reflected in Department enforcement policy and choice of sanction levels.

D. ENFORCEMENT POLICIES AND PROCEDURES

I. Fairness

It is not possible to make a thorough examination of the fairness or consistency of an enforcement process that has not yet begun. Nevertheless, in an effort to address the problem we have looked carefully at the process the Department has designed to effect enforcement.

As suggested above, the Department enforcement program begins with internal training for inspectors and other staff, aimed at an enforcement process that is consistent and predictable. As part of that training process, the Department has conducted 38 trial ergonomics inspections across a wide range of industries and a broad spectrum of business size. These are complete site visits, agreed to by the company involved, after which any "violations" of the ergonomics rule were noted. Employers received written report of the results of the inspection, including probable fines that would have been assessed for serious violations if the rule had been in effect. These trials were said by the Department to have been effective in evaluating the inspector training program. In addition, they received favorable and positive evaluations from the inspected companies. The department did an evaluation of 29 of these trial inspections via a telephone survey to employers. Twenty-three of the 29 employers participated in the telephone survey made by independent L&I staff. On a scale of 1-5, employers reported that inspectors did a good job of explaining the inspection process (score: 4.8), of making the reasons for the

inspector's activities understandable (score: 4.43), and that the inspection was fair (score: 4.09). The overall assessment of the survey found that comments were positive, but some concerns were expressed about the subjectivity used in applying the rule, consistency, and whether the inspectors were fully trained.

To assess the fairness of the program, it is useful to describe the contemplated enforcement process. An inspection will begin with an opening conference at which representatives of both the employer and the employees will be present. At this conference, the inspector will explain the reason for the inspection, its expected scope, the inspection process and the employer's responsibility under WISHA. The inspector will then conduct a walk-around tour of the facility to identify possible violations, taking notes and interviewing employees as needed.

At the close of the inspection the inspector will hold a closing conference with the employer and employee representatives. At this conference, the inspector will describe any apparent violations, as well as provide information about the rights and responsibilities of the parties and indicate any available Department services. Employer and employee representatives will be able to submit further information about any violations discussed. Citations will not be issued at the job site. Instead, following the inspection, the inspector's supervisor will review any recommended citation. Only approved citations will be processed further.

Citations may be issued to an employer for "serious" violations (death or serious injury could result) or "general" violations (related to health and safety but less serious). For general violations, usually there will be no penalty. For serious violations, penalties may range from \$100 to the statutory maximum of \$7000. Typically, penalties for serious violations will run in the \$600-\$1200 range, and will vary as a function of their gravity, the size of the employer, previous history of the employer and the number of employees affected.

An employer dissatisfied with a citation can get an informal review within the Department (the so-called reassumption process) presided over by senior staff members who were not involved in the original citation. The employer will be able to present his or her side of the controversy, as well as introduce additional evidence that may have become available. Appeal from an unfavorable final departmental decision goes to the independent Board of Industrial Insurance Appeals. Failing efforts at mediation, that body will conduct a formal trial-type hearing. Further appeals are to the court system.

II. Consistency

We have been asked to consider whether the rule can be consistently enforced. We have concluded that significant mechanisms for controlling inconsistency are in place. The WRD is directly addressed to enforcement staff and is an important step toward creating enforcement consistency. Written with significant opportunity for public comment, the WRD provides specific guidance to WISHA enforcement staff on a wide array of questions likely to arise in the context of an ergonomics inspection.

Inspector training programs will foster consistent interpretation of the rule as will the internal monitoring of citations by senior officials. It is worthy of note that some decisions (e.g., decisions about economic and technical feasibility) are marked for automatic higher level review by agency officials. Finally, the system of internal and external administrative review and, finally, judicial review should assure acceptable levels of consistency.

In all, we think these mechanisms provide a strong foundation for consistent enforcement."

III. Conclusions

The Panel has determined that the process appears to be both fair and consistent. It carefully permits affected persons meaningful opportunities to learn the basis for the citation and explain their side of the matter, with both internal and external administrative review and ultimately review by the courts. Consistency will be aided by the system of internal administrative review, as well as by the various external administrative and judicial reviews.